**Supplementary Figures.**

**Figure S1. Unmodified rAAV serotypes do not transduce primary microglia culture.**

Single stranded hCBA-EGFP packaged in AAV capsids 1, 2, 3, 4, 5, 6, 7, 8, 9 and rh10 was used to transduce cd11b positive primary microglia cultures (a) or primary neuroglial cultures (b). DAPI has been used as a nuclear counterstain (a). Scale bar, 100μm. Data is representative of at least 2-3 independent transduction experiments.

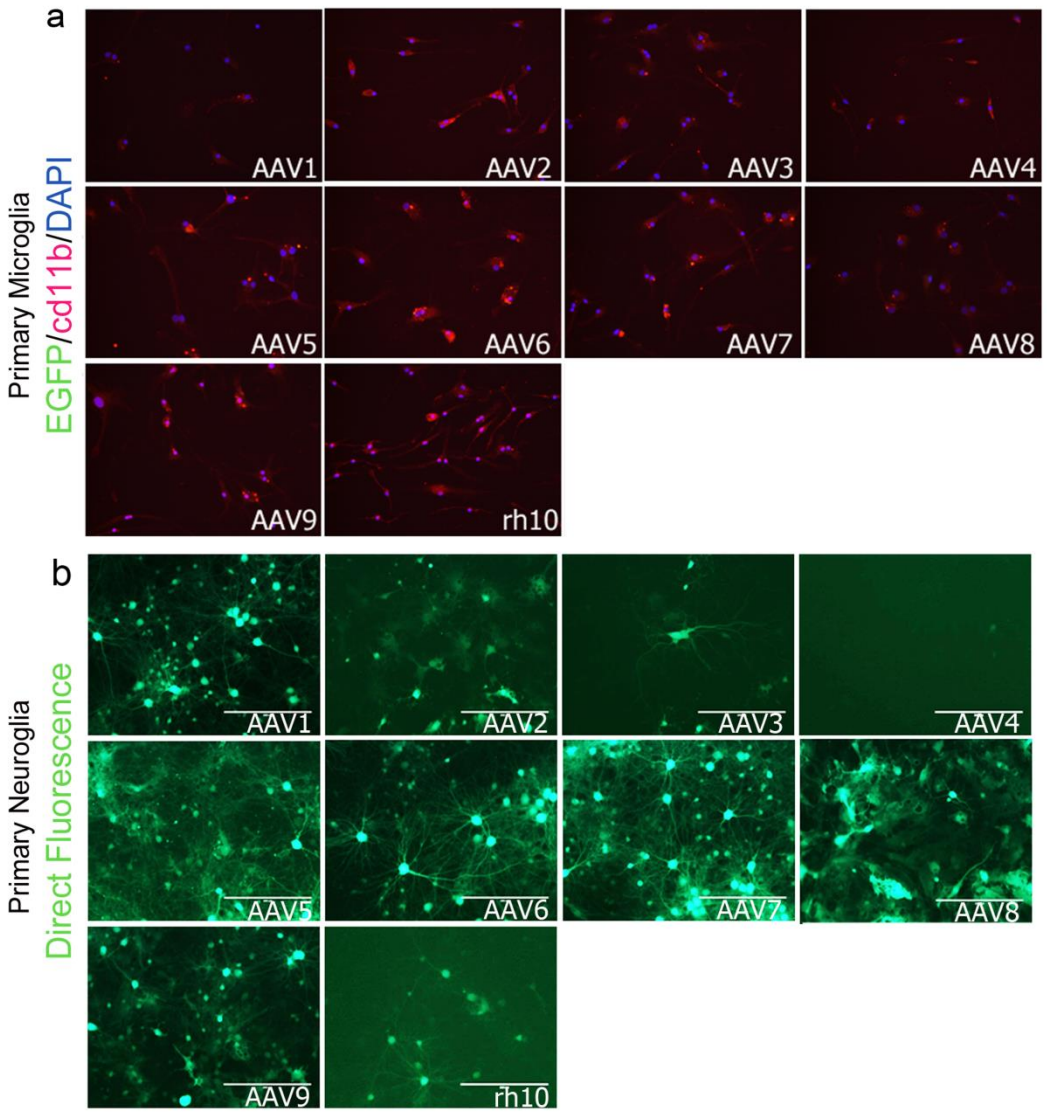

**Figure S2. scCBA-GFP packaged in capsid modified AAV6 transduces all primary cell types efficiently, including cells with microglia-like morphology**

Capsid modified AAV6 serotypes transduce non-neuronal and non-astrocytic cells in primary mixed neuroglia cultures. scCBA-GFP (packaged in wild type AAV6 and 3 different modified AAV6 capsids) can transduce microglia type cells (arrows) that are not co-labeled with MAP2 (neuron-specific) or GFAP (astrocyte-specific). Magnification, 400x.

Data is representative of at least 3 independent transduction experiments.

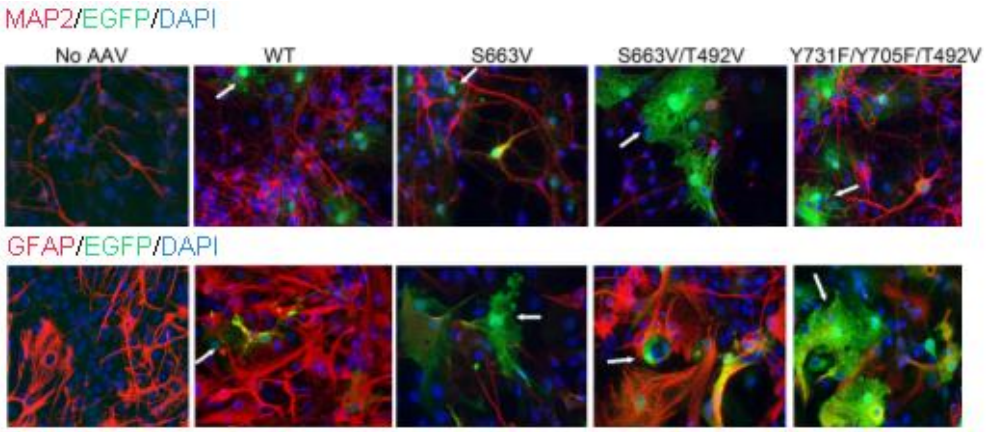

**Figure S3. Comparison of the efficiency of single stranded and self-complementary vectors packaged in WT AAV6 and TM6 in primary microglia.**

a. Flow sorting of formalin fixed primary murine microglia transduced with WT AAV6 and capsid modified AAV6 (TM6) expressing hCBA promoter driven GFP. The GFP is expressed either from a conventional single stranded (ss) or a self-complementary (sc) vector. *p<0.05 compared to 'No AAV' control; #p<0.05 compared to sc-TM6 control; Multiple t test with Q=0.05. b. Representative pictograph depicting direct GFP fluorescence of live microglia corresponding to the experiment described in a. Scale bar, 400µm. Data is representative of 2 independent transduction experiments.

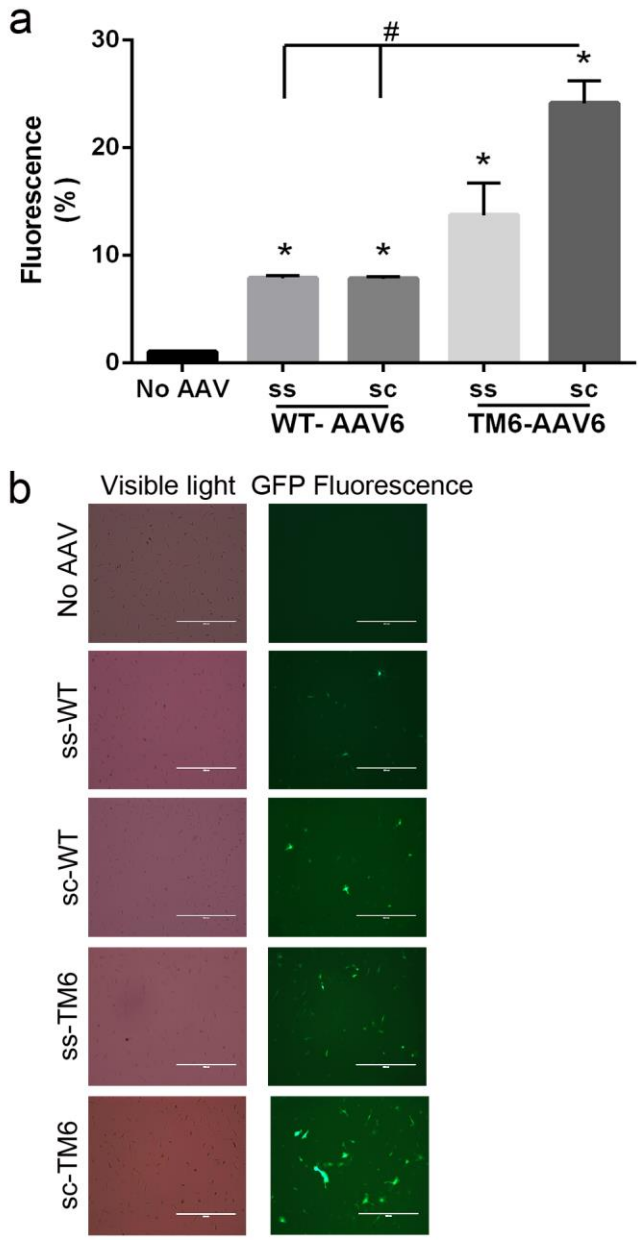

**Figure S4. scCBA-GFP packaged in TM6 capsid efficiently transduces various cell types in the brain.**

Wild type mice were injected in the cerebral ventricles on neonatal day P0 with scCBA-GFP packaged in TM6 capsid and analyzed at P15. Representative immunofluorescence picture shows wide expression of GFP protein (a), with mostly neurons transduced in the cortex (b) and only a few Iba-1 immunopositive microglia (c). Scale Bar, 500µm (a), 50µm (b), 12.5µm (c). n=3 animals/group.

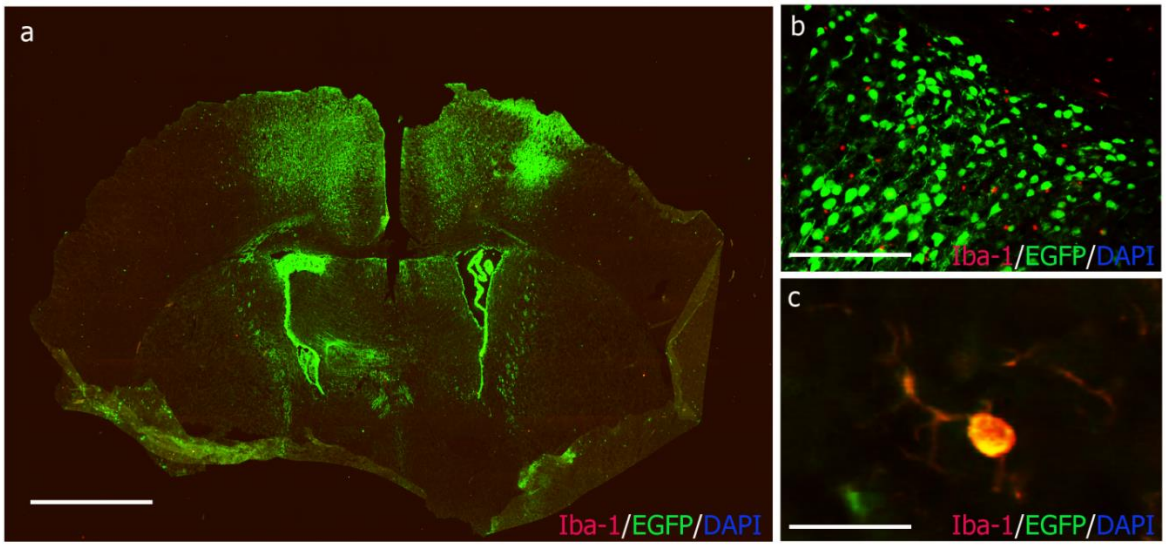

**Figure S5. MHCII is not upregulated in scCBA-GFP transduced brain.**

Wild type mice were injected in the cerebral ventricles on neonatal day P0 with self-complementary vector expressing hCBA promoter driven GFP and analyzed at P15 and P30. A separate cohort of adult wild type mice was injected in the hippocampus (Hpc) with the same virus at 2 months of age and analyzed after 15 days. Two independent representative immunofluorescence picture shows wide expression of GFP protein (green) in microglia (arrowheads) and other cells. None of these cells co-stained with MHCII (red, arrow). No AAV represents uninjected control mice. Scale Bar, 100µm. n=3 animals/group.